

City-Wide Storm Water Management

City of Waukesha

November 13, 2013

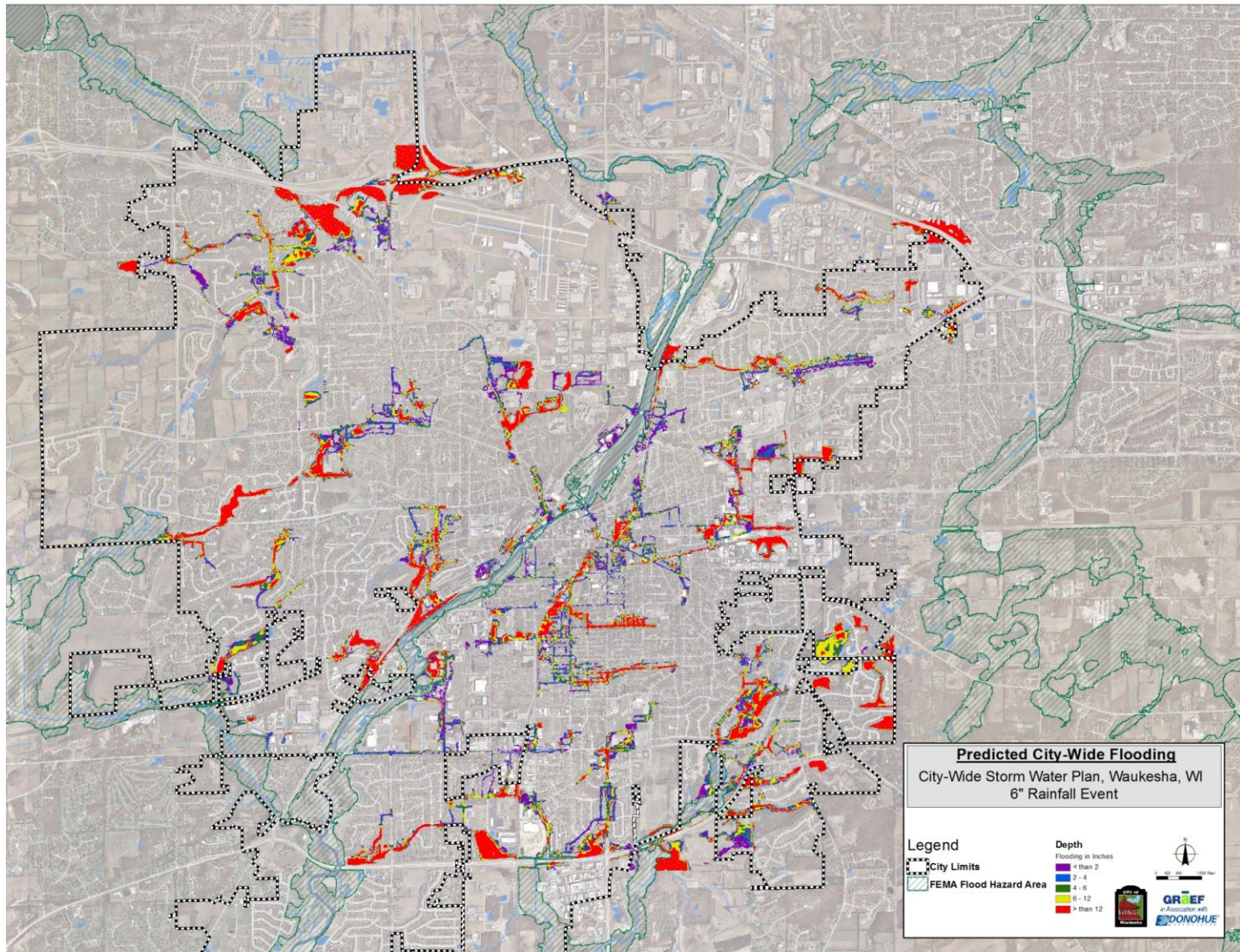


2012 City-wide Storm Water Analysis

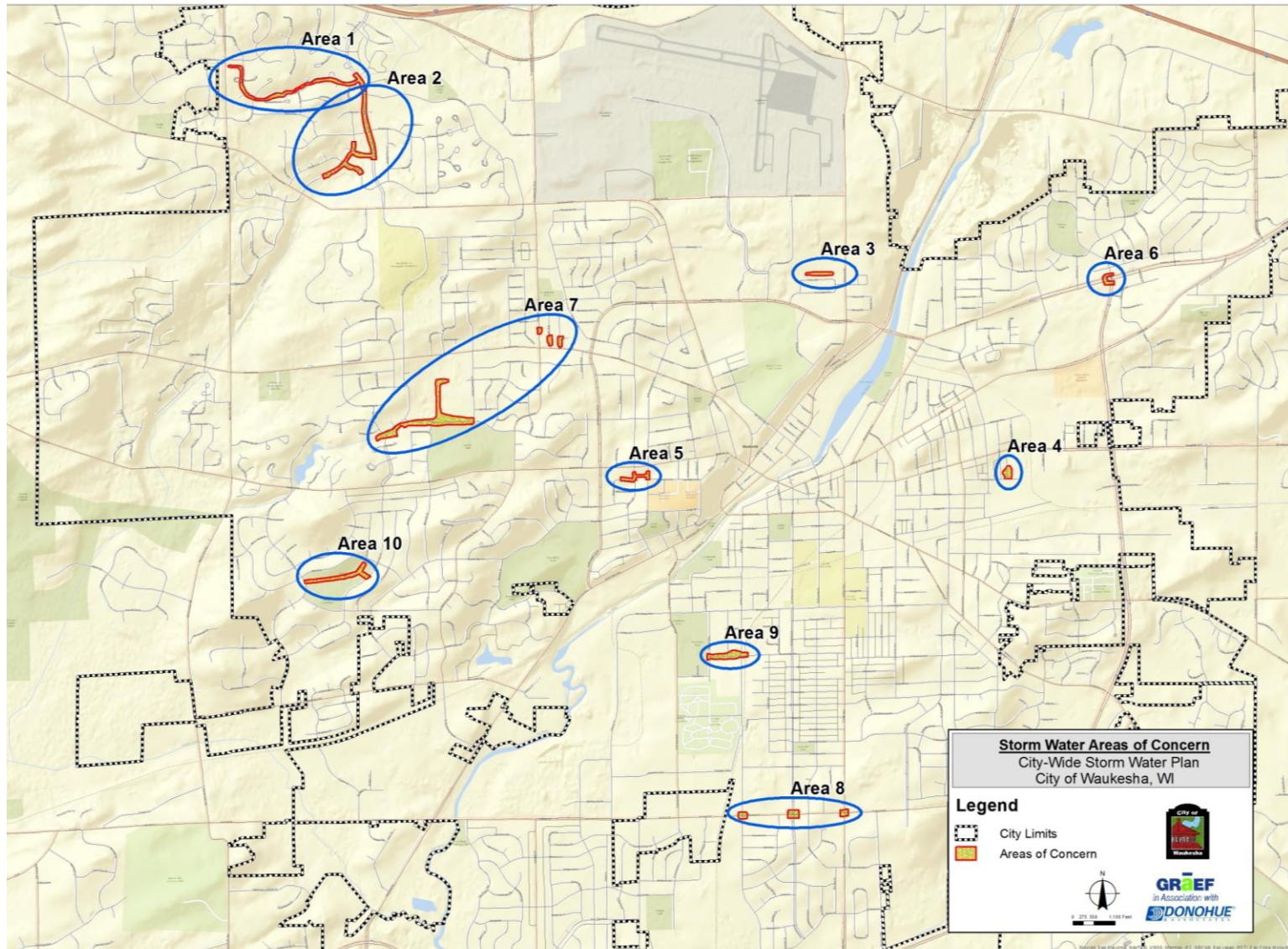
PROJECT GOAL

**Reduce Unacceptable
Storm Water Flooding
Throughout the City**

Predicted City-wide Flooding



Evaluated Alternatives for 10 Areas of Concern



5 Public Meetings Were Held

May 1, Areas 1 and 2



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graph TD; A[May 1, Areas 1 and 2] --> B[May 15, Areas 5 and 7]; B --> C[June 5, Areas 4 and 6]; C --> D[June 19, Areas 8 and 9]; D --> E[July 17, Summary of All Areas];
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May 15, Areas 5 and 7

June 5, Areas 4 and 6

June 19, Areas 8 and 9

July 17, Summary of All Areas

Steps Taken After July 17 Meeting

Input From Board Of Public Works

Direction by Council

Implementation Plan



Implementation Plan

Ranked Areas/Projects

Developed Recommended
Program

Prepared 20-year Implementation
Plan



Ranking Based Upon Four Criteria

Property Impacts

Public Safety

Financial Leveraging

Environmental Impacts

GRäEF

in Association with

 **DONOHUE**
& ASSOCIATES

TABLE 1A

**DRAINAGE AREA PRIORITY FACTORS
OVERALL PROGRAM
CITY OF WAUKESHA STORM WATER MANAGEMENT PLAN**

Drainage Area	Aldermanic District	Area of Concern	Other Projects in the Drainage Area	Total Cost per Drainage Area	Ranking							
					Property Impacts (1)	Public Safety (2)	Financial Leveraging (3)	Environmental Impacts (4)	Combined Ranking (5)	Area of Concern Priority (6)	Comments	
1	5 & 14	Rolling Ridge Dr. and N. University Dr.	Waukesha Bypass road project on Meadowbrook Road	\$5,900,000	5	1	2	4, 5	3.4	1	Addresses street flooding	
2	5 & 14	N. University Dr., between Emslie Dr. and Darrell Dr., as well as Patrick Ln., south of Darrell Dr.	None in the current Five Year Road plan or private projects	\$7,000,000	4	2	8	5, 4	4.6	3	Addresses street flooding	
3	2	Airport Business Park and Peters Dr.	None in the current Five Year Road Plan or private projects	\$800,000	1	3	8	8, 8	5.6	8	3.8" already implemented	
4	3, 8 & 9	Frame Park Creek at Harding Ave. and Anoka Ave.	Work is outside of roadways	\$900,000	2	4	8	1, 8	4.6	4	Addresses flooding in the alley	
5	3, 4, 13 & 15	Lawndale Ave. and S. Washington Ave.	Road project on South Moreland Boulevard	\$4,400,000	3	8	4	6, 6	5.4	7	Proximity to Hospital - neighborhood street flooding	
6	1	E. Moreland Blvd. at Wolf Rd.	Planned reconstruction of Moreland Blvd by WisDOT and by the City	\$9,000,000	6	7	1	8, 3	5	5	Addresses street flooding	
7	4, 13 & 14	Summit Ave. and Michigan Ave.	Road construction projects on Summit Drive	\$17,400,000	7	9	5	3, 2	5.2	6	Includes conveyance in Sylvan Dr area and three areas of detention	
8	6, 7 & 10	S. West Ave., S. Grand Ave., and S. East Ave. at W. Sunset Dr.	Road construction on South Grand Avenue and redevelopment of former Kmart parcel	\$11,100,000	8	6	3	2, 1	4	2	Addresses street flooding. The cost does not include \$1,400,000 of TIF funding	
9	6, 8, 10 & 11	W. Newhall Ave. at S. West Ave.	Newhall Avenue road work	\$7,700,000	10	10	6	1, 7	6.8	9	Above ground storage at former DMV/DOT property	
10	13 & 14	Merrill Crest Park	None in the current Five Year Road Plan or private projects	\$4,600,000	9	5	8	8	7.6	10		
Total Cost: \$68,800,00												

(1) Based on the number of structures where flooding was addressed in the areas of concern

(2) Based on the number of blocks of flooded roadway flooded in the areas of concern

(3) Consideration for planned road reconstruction, TIF Districts and known private development

(4) Based on the number of potential water quality facilities and improvements

(5) Average of rankings

(6) Based on the combined ranking

Overall Flood Mitigation Projects

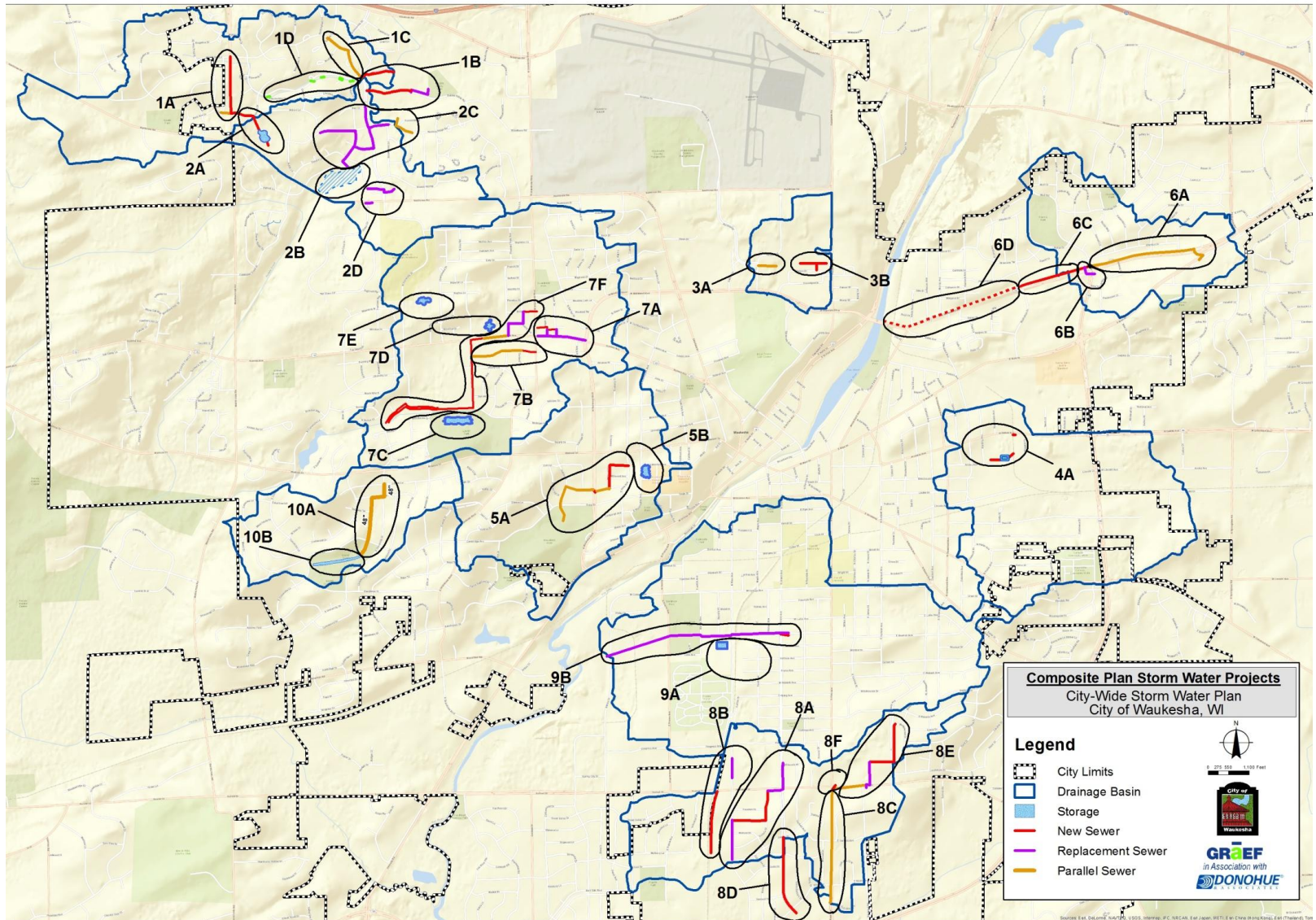


TABLE 2A

RECOMMENDED PROGRAM

CITY OF WAUKESHA STORM WATER MANAGEMENT PLAN

					Ranking						
Drainage Area	Aldermanic District	Area of Concern	Other Projects in the Drainage Area	Total Cost per Drainage Area	Property Impacts (1)	Public Safety (2)	Financial Leveraging (3)	Environmental Impacts (4)	Combined Ranking	Area of Concern Priority (5)	Comments
1	5 & 14	Rolling Ridge Dr. and N. University Dr. (6)	Waukesha Bypass road project on Meadowbrook Road	\$5,900,000	5	1	2	4	3.4	1	Addresses street flooding
2	5 & 14	N. University Dr., between Emslie Dr. and Darrell Dr., as well as Patrick Ln., south of Darrell Dr.	None in the current Five Year Road plan or private projects	\$7,000,000	4	2	8	5	4.6	3	Addresses street flooding
3	2	Airport Business Park and Peters Dr. (7)	None in the current Five Year Road Plan or private projects	\$600,000	1	3	8	8	5.6	8	3.8" already implemented
4	3, 8 & 9	Frame Park Creek at Harding Ave. and Anoka Ave.	Work is outside of roadways	\$900,000	2	4	8	1	4.6	4	Addresses flooding in the alley
5	3, 4, 13 & 15	Lawndale Ave. and S. Washington Ave. (8)	Road project on South Moreland Boulevard	\$2,300,000	3	8	4	6	5.4	7	Proximity to Hospital - neighborhood street flooding
6	1	E. Moreland Blvd. at Wolf Rd. (9)	Planned reconstruction of Moreland Blvd by WisDOT and by the City	\$6,200,000	6	7	1	8	5	5	Addresses street flooding
7	4, 13 & 14	Summit Ave. and Michigan Ave. (10)	Road construction projects on Summit Drive	\$5,400,000	7	9	5	3	5.2	6	Includes conveyance in Sylvan Dr area and three areas of detention
8	6, 7 & 10	S. West Ave., S. Grand Ave., and S. East Ave. at W. Sunset Dr. (11)	Road construction on South Grand Avenue and redevelopment of former Kmart parcel	\$11,100,000	8	6	3	2	4	2	Addresses street flooding
9	6, 8, 10 & 11	W. Newhall Ave. at S. West Ave (12)	Newhall Avenue road work	\$2,900,000	10	10	6	1	6.8	9	Above ground storage at former DMV/DOT property
Total Cost: \$42,300,000											

(1) Based on the number of structures where flooding was addressed in the areas of concern

(2) Based on the number of blocks of flooded roadway flooded in the areas of concern

(3) Consideration for planned road reconstruction, TIF Districts and known private development

(4) Based on the number of potential water quality facilities

(5) Based on the combined ranking

(6) Cost includes \$1,800,000 of improvements along Meadowbrook

(7) Cost does not include sewers along Airport Rd

(8) Cost does not include \$2,100,000 for underground storage at Waukesha Memorial Hospital

(9) Cost includes \$1,300,000 assumed to be paid by WisDOT for equivalent 48" storm sewer

(10) Cost does not include storm sewers along Michigan Ave and University Dr

(11) Includes TIF District providing an additional \$1,400,000 of

Recommended 20-year Plan

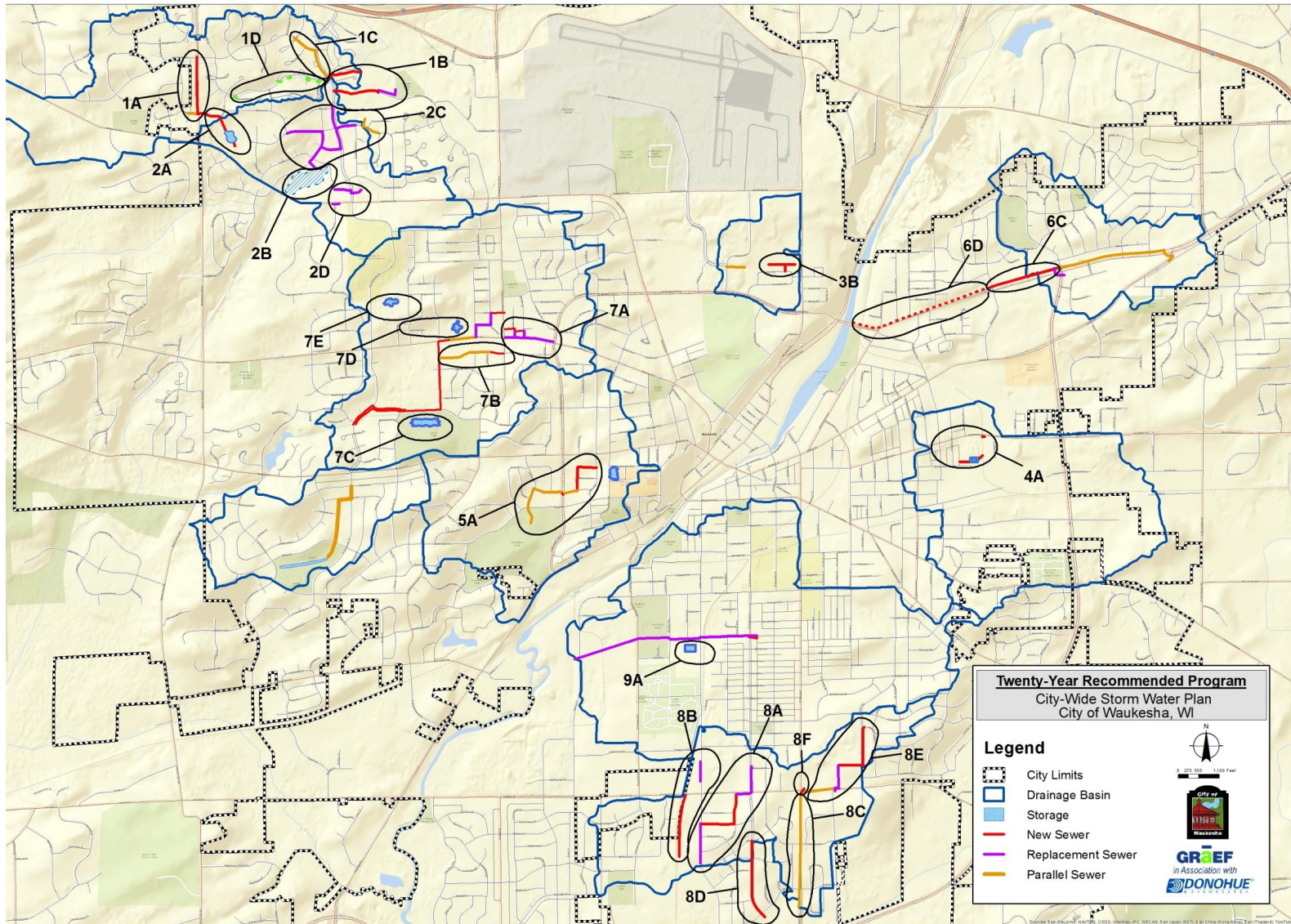


TABLE 3

**TWENTY-YEAR RECOMMENDED PROGRAM
STORM WATER SYSTEM IMPROVEMENTS
CITY OF WAUKESHA STORM WATER MANAGEMENT PLAN**

Priority	Project Number	Area	Project ID	Project Description	Project Estimated Cost	Priority Subtotal (annual cost)	Comments
1	1	Area 8	8C	Construct 66" parallel storm sewer in S. East Ave	\$2,100,000	\$2,100,000	Cost does not include \$1,400,000 of TIF funding
2	2	Area 1	1A	Incorporate 60" along Meadowbrook Dr and 24" storm sewer along Joanne Dr with Waukesha Bypass construction	\$2,600,000	\$2,600,000	Cost includes \$1,800,000 cost of Waukesha West Bypass improvements along Meadowbrook
3	3	Area 6	6C	Construct 60" storm sewer in E Moreland Blvd as part of WisDOT projects from Wolf Rd to Manhattan Dr	\$1,900,000	\$1,900,000	Cost includes \$1,300,000 assumed to be paid by WisDOT for equivalent 48" storm sewer
4	4	Area 6	6D	Construct 60" storm sewer in E Moreland Blvd from Manhattan Dr to the Fox River	\$4,300,000	\$4,300,000 (\$2,150,000)	In conjunction with City's East Moreland Blvd project
5	5	Area 7	7A	Construct 54", 42" and 36" storm sewers in Summit Ave east of N. Grandview Blvd and construct 36" storm sewer in Morgan Ave and 24" storm sewer in Sylvan Ter	\$1,600,000	\$1,600,000	
6	6	Area 2	2A	Construct detention south of Lancaster Dr	\$1,200,000	\$2,100,000	Parks and Recreation, DNR permits
6	7	Area 4	4A	Remove culvert downstream (south) of Arcadian Ave and add storage east of Harding Avenue	\$900,000		
7	8	Area 1	1B	Construct 60" storm sewer east of University Dr at Rolling Ridge Dr and 21", 30", 36" and 48" along Pebble Valley Rd	\$2,100,000	\$2,100,000	DNR Permits
8	9	Area 1	1D	Install culvert replacements along Rolling Ridge Dr	\$600,000	\$2,400,000	DNR permits
8	10	Area 3	3B	Construct 36" and 27" storm sewers in upper swale	\$600,000		
8	11	Area 8	8D	Install 36" in Grand Ave south of Debbie Dr	\$1,200,000		
9	12	Area 8	8A	Construct west system - 30" and 42" on S. Grand Ave, 42" on Sunset Dr, 42" on Victoria Dr, 42" on Baird St and 42" on West Ave	\$2,200,000	\$2,200,000	
10	13	Area 2	2B	Expand pond at Sandra Ln	\$700,000	\$2,100,000	DNR Permits
10	14	Area 7	7C	Construct storage in Lowell Park	\$800,000		Parks and Recreation
10	15	Area 7	7E	Construct storage at UWW soccer field	\$600,000		Waukesha County
11	16	Area 2	2C	Construct 24", 48" and 60" along University Ave, construct 24", 36" and 48" along Emslie Dr, construct 48" and 66" along Patrick Ln and 66" along Darrell Dr	\$4,600,000	\$4,600,000 (\$2,300,000)	
12	17	Area 9	9A	Construct storage at DOT parcel	\$2,900,000	\$2,900,000	
13	18	Area 8	8B	Construct 48" along Canadian National RR and install box culvert at S. West Ave.	\$1,700,000	\$1,700,000	Railroad
14	19	Area 1	1C	Construct 48" along Woodridge Lane and University Dr	\$600,000	\$1,800,000	
14	20	Area 2	2D	Construct 24" and 36" storm sewers south of Sandra Ln and construct 18" storm sewer in Northview Rd	\$500,000		
14	21	Area 7	7D	Construct storage at Summit View Elementary School	\$700,000		School District
15	22	Area 5	5A	Construct storm sewers from Lawndale Ave to Woodfield Park	\$2,300,000	\$2,300,000	
16	23	Area 7	7B	Construct 24" storm sewer along Garland Ave	\$1,700,000	\$1,700,000	
17	24	Area 8	8E	Construct 48" parallel storm sewer along Sunset Dr, construct 48" storm sewers north of Sunset Dr and 36" storm sewers along Tenny Ave	\$3,900,000	\$3,900,000 (\$1,950,000)	
TOTAL COST TWENTY-YEAR PROGRAM						\$42,300,000	

TABLE 3

**TWENTY-YEAR RECOMMENDED PROGRAM
STORM WATER SYSTEM IMPROVEMENTS
CITY OF WAUKESHA STORM WATER MANAGEMENT PLAN**

Privately Funded						
25	Area 5	5B	Work with Waukesha Memorial Hospital on future development to add underground storage volume	\$2,100,000		Private Funding Hospital
Overall Program Projects Not Ranked for Priority						
	28	Area 3	3A	Construct 21" storm sewer east of Airport Rd	\$200,000	10 yr implemented
	26	Area 6	6A	Construct 48", 42" and 24" storm sewers crossing E. Moreland Blvd at intersection with E. Main St, add 48" and 42" storm sewers along E Moreland Blvd between Wolf Rd and E. Main St	\$2,400,000	In conjunction with future roadway reconstruction
	27		6B	Install 5'x10' box culvert under E Moreland Blvd and relay 48" storm sewer under Les Paul Parkway	\$400,000	In conjunction with future roadway reconstruction
	29	Area 7	7F	Construct 54", 60" and 66" along Summit Ave, construct 54" along Brad St, Westown Ave, Wall St and Western Ave, construct 66" and 72" along Greenmeadow Dr, construct 72" and 84 " along Michigan Ave and University Dr	\$12,000,000	
	30	Area 7	7G	Construct storm sewer between Sylvan Ter and N. Grandview Blvd	\$0	Completed in 2012
	31	Area 8	8F	Construct 60" HE at intersection of Sunset Dr and East Ave	\$0	East Avenue Project
	32	Area 9	9B	Conveyance along Newhall Ave	\$4,800,000	
	33	Area 10	10A	Construct 48" storm sewers along University Dr and Algoma Ter	\$1,800,000	
	34	Area 10	10B	Construct storage in Merrill Crest Park	\$2,800,000	
TOTAL COST PROJECTS BEYOND TWENTY-YEAR PROGRAM					\$24,400,000	
TOTAL OVERALL PROGRAM COST					\$68,800,000	